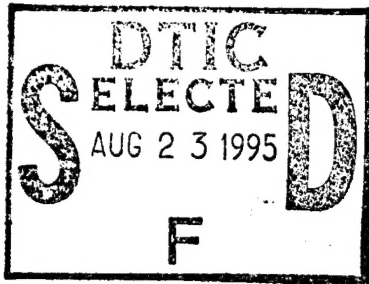


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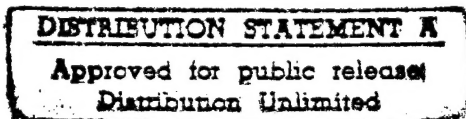
LEVERAGING TECHNOLOGY: USING THE PRACTICAL ESSENCE OF OPERATIONAL  
ART TO TRANSLATE INFORMATION INTO DECISIONS

by

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.



Signature: William D. Valentine, Jr.

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## ABSTRACT

There exists a belief among many that we are in the midst of a revolution in military affairs. In this "revolution", technology is hailed as the new "king" and information as the new "currency" of victory. The goal of the "revolution" seems to be the elimination of fog and friction by using new technologies to collect near perfect, real-time information that will allow the commander to make decisions based on his ability to predict the shape of the future battlefield.

However, in order to best take advantage of new technologies, a reexamination of the way commanders plan and make decisions is required. The goal should be to leverage technological advantages by developing a decision making process, centered on non-predicative analysis, that enables commanders to translate information into focused operational decisions. The fulcrum for this lever is a renewed emphasis, understanding, and application of modern operational art.

This paper argues that the practical essence of modern operational art, distilled from theoretical definition, is the management of time, resources, and risks in a dynamic environment to orchestrate temporally and spatially distributed operations into one coherent whole. In demonstrating how this practical essence has been applied in the past, the paper reinterprets four different campaigns/operations using a non-predicative model. The model groups the effects of decisions made regarding the management of time, resources, and risks in the following categories: (A). MISSION/OBJECTIVE; (B). ENEMY CAPABILITIES AND WEAKNESSES; (C). OWN CAPABILITIES AND WEAKNESSES; (D). TERRAIN AND WEATHER.

The final section of the paper examines how using the preceding model to apply the practical essence of modern operational art will support maneuver warfare in the 21st century by bringing about a change in the decision-making process. The main thrust of this section is that whatever the changes brought about by the "revolution in military affairs", they will not obviate the need to ensure that command decisions at the operational level are founded on a decision making process that achieves the vital link between strategic aims and the tactical employment of forces on the battlefield. The operational commander can best do this by continually reassessing his situation and enemy reactions, using the essence of operational art and a non-predicative process to translate information into operational decisions.

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## INTRODUCTION

The demise of the Soviet Union, and with it the relative clarity of a bi-polar focus, coupled with the swift and efficient execution of Operation DESERT SHIELD/DESERT STORM, have spawned a belief among many that we are now on the cusp of a revolution in military affairs. The leaders of this revolution hail technology as the new "king" and information as the new "currency of victory"<sup>1</sup>. The ultimate goal of the revolution seems to be the elimination of fog and friction by using new technologies to collect near perfect, real-time information that will enable the commander to make decisions based on his ability to predict the shape of the future battlefield.

Debating whether or not a revolution in military affairs is underway is, for the most part, irrelevant. The key issue, masked by revolutionary rhetoric and generally missed in the euphoric pursuit of the ultimate "black-box" at the end of the "technological rainbow", is the requirement to reexamine the way commanders plan and make decisions in order to make optimum use of potentially quantum increases in the quantity and quality of information available. The goal should be to leverage technological advances by developing a decision making process, centered on non-predicative analysis of real time information, that enables commanders to translate that information into focused operational decisions. The fulcrum for this lever is a

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<sup>1</sup> MG John F. Stewart, Jr., "Command and Control Warfare and Intelligence on the Future Digital Battlefield," Army Research, Development and Acquisition Bulletin, November-December 1994, p. 14.

renewed emphasis, understanding, and application of modern operational art.

This paper will first reinterpret what modern operational art is; distilling its practical essence from theoretical definition; then use a non-predicative model to analyze how the essence of modern operational art was applied in various situations in the past; and conclude by examining how using the model to apply the practical essence of modern operational art will support maneuver warfare in the 21st century.

### LEVELING THE PLAYING FIELD

#### WHAT IS MODERN OPERATIONAL ART?

First of all, it is important to understand that operational art is firmly rooted in the principles of war, and is in fact the tool by which the advantages promised by these principles can be translated into operational reality<sup>2</sup>. Operational art has been defined as spanning all levels of war from operational-tactical to national-strategic. It is primarily concerned with both the theory and practice of: planning, preparing, conducting, and sustaining major operations and campaigns to accomplish operational and/or strategic objectives in a theater<sup>3</sup>.

Many attempt to explain the theoretical definition above in

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<sup>2</sup> Headquarters, Department of the Army, "FM 100-5 Operations", June 1993. pp. 2-4 - 2-6. Following 9 principles recognized: OBJECTIVE; OFFENSIVE; MASS; ECONOMY OF FORCE; MANEUVER; UNITY OF COMMAND; SECURITY; SURPRISE; SIMPLICITY.

<sup>3</sup> Milan N. Vego, "Operational Art (Lecture)," Unpublished lecture notes, U.S. Naval War College, Newport R.I: 14 March 1995, pp. 4-5.

terms of its antecedent, classic military strategy<sup>4</sup>. The fundamental difference between classic military strategy and modern operational art is that the former is grounded in the "strategy of the single point" and the decisive battle of annihilation, while the latter emphasizes speed and maneuver. The aim of modern operational art is to achieve victory through the lateral distribution of forces throughout the breadth and depth of a theater, using simultaneous and successive operations.

Attempts at a hybrid marriage between classic military strategy and operational art have yielded unnecessarily complex explanations, bound by restricted conceptual horizons that incorporate some "high-drag" coefficients to clarity such as operational/tactical centers of gravity and the myriad "flavors" of lines of operations. Ultimately, this approach tends to distort and obscure our understanding of the practical essence of modern operational art<sup>5</sup>.

The first step in bringing about a change in the way information is used to make decisions is to translate the above theory into an understanding of the practical essence of modern operational art. Carl von Clausewitz asserted that "everything in war is simple, but the simplest thing is difficult<sup>6</sup>". So it

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<sup>4</sup> James J. Schneider, "The Loose Marble - and the Origins of Operational Art," Parameters, March 1989, p. 85.

<sup>5</sup> Ibid.

<sup>6</sup> Carl von Clausewitz, On War, trans. and ed. M. Howard and P. Paret (Princeton, NJ: Princeton University Press, 1984). p. 119.

is with understanding the practical essence of operational art. Distilled from the preceding definition into its most concise form, the practical essence of operational art is the management of time, resources and risks in a dynamic environment to orchestrate temporally and spatially distributed operations into one coherent whole.

In applying this practical essence, it is critical to remember that war is an interactive process, with every decision and action undertaken by a commander subject to the "Ripple Effect". Specifically, that fundamental precept asserting that, like a pebble tossed into a pond, every decision/action has both a measurable effect in the specific time and place of its application, and many less quantifiable "ripples" that no amount of technology can fully anticipate. In this interactive environment, a decision process that is based solely on predicative analysis rather than the application of the practical essence of operational art is time consuming, resource diverting, and risk denying. This approach will not support maneuver warfare in the 21st century.

It is the relative understanding and application of the practical essence of operational art that has provided the margin between victor and vanquished in the past and must be recognized as the foundation for non-predicative operational decisions in the future if information, as the "currency of victory", is to be "invested" in the most effective manner possible.



## APPLYING THE PRACTICAL ESSENCE OF OPERATIONAL ART:

### A MODEL FOR NON-PREDICATIVE ANALYSIS

The following historical analysis will reexamine four different campaigns/operations, ranging from the Napoleonic period to DESERT STORM. A non-predicative model, consisting of the following categories, will be used to group the effects of the decisions made regarding the management of time, resources and risks: (A). MISSION/OBJECTIVE; (B). ENEMY CAPABILITIES AND WEAKNESSES; (C). OWN CAPABILITIES AND WEAKNESSES; (D). TERRAIN AND WEATHER.

#### MISSION/OBJECTIVE: THE FALKLANDS WAR.

The keystone in applying the essence of operational art and achieving victory in battle is establishing a clearly defined, decisive, and attainable objective for every military operation. The war between Britain and Argentina over the Falkland Islands aptly illustrates the importance of this point.

In this war, the British mission/objective from the start was to recapture the Falkland Islands and expel Argentine forces. The implicit assumption underlying this mission was war. Time was a critical factor because the mission had to be accomplished in roughly 100 days in order to avoid resource exhaustion and impending weather. On the other hand, the Argentinian objective underwent a significant change during the critical initial stages of the conflict, transforming from "occupy to negotiate" to "reinforce in order to deter the British from retaking the

islands, then negotiate"<sup>7</sup>. Moreover, the Argentinian plan was founded on the following fatal assumptions:

(1). The British government would not respond militarily.

(2). The United States would bring its weight to bear in the conflict and not allow it to escalate<sup>8</sup>.

The obvious differences in decisiveness and clarity between these two missions, and the assumptions that form their underpinnings, allowed the British to better apply the essence of operational art to create relative advantages with regard to the principles of war. A primary example of how the British commander's decisions regarding the management of time, resources and risks allowed him to exploit the principles of war was the early and rapid deployment of nuclear submarines to the theater thereby achieving a relative advantage in offensive (initiative), mass, economy of force, security and surprise. The direct benefit of this decision was that it effectively prevented Argentina from reinforcing the islands. In addition, the British commander was able to create and exploit insurmountable advantages in offensive, surprise, security, economy of force, and maneuver by initiating hostilities with a combined air and naval offensive. The latter being punctuated by the sinking of the Argentine flagship BELGRANO, compelling the Argentine command authority to remove the remainder of the fleet, including the

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<sup>7</sup> Ruben O. Moro, The History fo the South Atlantic Conflict: The War for the Malvinas, New York, N.Y.: Praeger Publishers, 1989., p. 69.

<sup>8</sup> Ibid.

naval air arm, from further action.

Key to British success was that the commander never assumed away risk, but rather, captured "ripples" by continually reassessing his situation and the enemy's reaction, satisfactorily managing time, resources, and risks. Nowhere was this more evident than in the commander's decision to use special forces to destroy Argentinian ground attack aircraft on the Falkland Islands prior to the landing of the troops. This decision not only left the Argentinian ground forces without air cover, but, more importantly, also reduced the risk to British ground troops. This became decisive after the Atlantic Conveyor, carrying all British mobility assets, was unexpectedly sunk, forcing the British troops to literally walk to their objective over open terrain.

The ultimate result of the British commander's understanding and application of the practical essence of operational art was a mission-capabilities match that resulted in victory.

#### ENEMY CAPABILITIES AND WEAKNESSES: OPERATION DESERT STORM.

The operational artist must consider the enemy's dispositions, equipment, doctrine, and capabilities in properly managing time, resources and risks to achieve the desired objective. The overwhelming victory by the U.S. led coalition in Operation Desert Storm stands as a stark example of how accurately assessing an enemy's capabilities and weaknesses can contribute to the effective application of operational art.

When the war began, the Iraqi Army in the KTO was estimated at

530,000 men, about 4,300 tanks, 2,700 armored fighting vehicles and 3,000 artillery pieces<sup>9</sup>. However, these figures in and of themselves, mask the main problem that the coalition commander, General Schwarzkopf, had to solve. Classic combat theory requires advantages of 3:1 to advance, and 5:1 to advance into heavy fortifications. Overall, Central Command had to cope with a numerical inferiority of about 4:3 in tanks and worse than 5:3 in artillery. Total numbers of troops were about equal, but the coalition forces had a much higher ratio of tail to teeth. The only coalition numerical edge was in aircraft<sup>10</sup>.

The solution was a plan to wear down Iraqi resistance by air attack, and then win by a deep flanking armored attack<sup>11</sup>. Through timely use of intelligence and deep reconnaissance by special forces, Central Command realized that the Iraqi flank was open along the Saudi-Iraqi border to the west of Kuwait. Key to the success of this plan was the use of deception in the form of amphibious feints, and the inventive combination of disinformation by action (bombing) and disinformation through briefings to further reduce risk.

Whatever the private estimate of the quality of Iraqi troops, Central Command could not afford to act on an assumption of innate allied superiority. The overriding assumption had to be

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<sup>9</sup> Norman Friedman, Desert Victory. Annapolis, Maryland: Naval Institute Press, 1991, p. 119.

<sup>10</sup> Ibid., pp. 217-218.

<sup>11</sup> Ibid., p. 218.

that key Iraqi units were still intact, despite the bombing, and direct assaults on their positions could prove very costly in terms of men, material and time<sup>12</sup>.

The cumulative effect of accurately assessing Iraqi capabilities and weaknesses, making solid assumptions regarding those capabilities and weaknesses, and effectively managing time, resources and risks was a decided advantage with regard to the principles war.

#### OWN CAPABILITIES AND WEAKNESSES: THE IBERIAN CAMPAIGN.

The successful application of the essence of operational art must take into account the relative capabilities and weaknesses of ones own force. The operational artist must consider relative mobility, protection, and firepower in crafting a plan that makes full use of the reinforcing effects of combined arms. One of the best examples of how an accurate assesement of own force capabilities and weaknesses enhanced a commander's ability to exploit time, apply resources, and reduce risks can be found by briefly examining British operations on the Iberian Penninsula during the war with Napoleonic France.

In this conflict, Britain's chief strength lay with her powerful fleet, her main weakness was the lack of a strong land force to directly challenge the superior French army. Thus, the primary task for the operational artist was to craft a plan that would allow the "whale" to mortally wound the "elephant".

Success was achieved by effectively and efficiently melding

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<sup>12</sup> Ibid.

the strong maritime forces with the relatively weaker ground forces to forge a powerful amphibious force. This allowed the British to frequently transport men and equipment by sea; a method that was invariably safer, cheaper in terms of resources required, and quicker. With no force to effectively counter these maritime operations, the French were eternally threatened with landings on the sea-shore, requiring their army to detach thousands of badly needed troops to patrol beaches, garrison ports, and man coastal batteries. In 1810, for example, two British squadrons tied down some 20,00 Imperial troops along the Biscay coast, with an additional 20,000 French soldiers required to invest the naval base at Cadiz<sup>13</sup>.

Furthermore, these sea-shore guards frequently became targets themselves. Required to patrol enormous lengths of coastline, they were invariably thin on the ground and easy prey for amphibious forces. Many small detachments were annihilated before assistance could arrive, and, in 1811, a whole French army corps sustained a serious defeat when attacked by a fleet-borne force numbering 12,000 men<sup>14</sup>.

The effective application of the essence of operational art afforded the British distinct advantages with regard to the principles of offensive, mass, economy of force, maneuver, security, and surprise. They deftly employed these advantages to

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<sup>13</sup> David Gates, The Spanish Ulcer: A History of the Penninsular War, W.W, Norton and Company, Inc. 1986., p. 29.

<sup>14</sup> Ibid.

create and exploit French vulnerabilities, while at the same time reducing risks to the vulnerabilities of their own force.

TERRAIN AND WEATHER: THE GERMANS IN NORWAY AND DENMARK.

A commander's ability to manage resources, time and risk are heavily dependent on an appreciation for the physical characteristics of a particular theater. He must select avenues of approach that permit rapid advance, afford maneuver opportunities, provide cover and concealment, permit lateral shifting of reserves, allow good communications, resist obstruction by enemy obstacles, and orient on key terrain<sup>15</sup>. Operation Weserubung, the World War II German campaigns in Norway and Denmark demonstrate the importance of this point.

In OPERATION WESERUBUNG, the German objective was to forestall a British intervention in the Scandanavia/Baltic Sea area, provide security for the sources of Swedish iron ore, and give the Navy/Air Force advance bases for attacks on Britain<sup>16</sup>. This mission was to be accomplished in only three days.

Given the risks and limitations imposed by the lack of time, insufficient resources and British naval superiority, it was imperative the German planning effort produce a plan that took advantage of the peculiarities of the Norweigan geography. The Germans were able to capitalize on one feature of the country which stood out above all others, namely, that the population,

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<sup>15</sup> FM 100-5. p. 8-2.

<sup>16</sup> Earl F. Ziemke, The German Northern Theater of Operations, 1940-1945, Headquarters, Department of the Army Pamphlet, no. 20-271, Washington DC, 15 December 1959., p. 22.

mobilization, and economic centers were concentrated along the coast or in valleys cutting inland from the coast and that settlement was not contiguous but further concentrated in nodes relatively isolated from one another<sup>17</sup>. This allowed the Germans to use six separate maneuver elements to effectively cripple 5 of 6 Norwegian divisions without having to fire a shot. The result enhanced surprise, complicated the defender's response, and prevented failure at any single point from stopping the entire invasion.

The Germans also correctly viewed the theater as predominately maritime and thus were able to use a combination of the sea, the weather and accurate intelligence to mitigate the risk imposed by the British fleet by simply maneuvering to avoid it or hiding. Effectively using the physical characteristics of the theater in this manner, and continually reassessing the situation, allowed the Germans to achieve operational success.

#### OPERATIONAL ART AND THE NON-PREDICTIVE PROCESS

Each of the foregoing examples reinterprets the thought processes of various commanders by using a non-predicative model. The model demonstrates how each commander was able to apply the practical essence of modern operational art by continually reassessing the effects of decisions/actions. Figure (1) provides a graphic representation of this process. On the future battlefield, where technology will provide increased access to rapidly changing information, the disciplined and timely

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<sup>17</sup> Ibid., p. 26.



application of military effort will be essential.

Clausewitz cautioned "...not to take the first step without considering the last<sup>18</sup>. The challenge for the operational commander, however, remains plotting the "steps" in between. Whatever the changes promised by the revolution in military affairs, they will not obviate the need to ensure that these "steps" are founded on command decisions that achieve the vital link between strategic aims and the tactical employment of forces on the battlefield.

Simply developing the technology to deliver more and better information at increasingly faster rates, without also taking positive measures to reexamine the thought process by which that information is translated into decisions could easily result in operational confusion and strategic paralysis. The implication that emerging technologies will be able to render information of such purity and clarity that commanders will be able to predict the future suggests that uncertainty, and therefore risk, can be eliminated. Failure to depart from this predicative approach to information analysis and decision making runs the risk of making the operational decision appear like no decision at all, but rather merely the logical conclusion of mathematical calculations based on the assumption of near perfect information<sup>19</sup>. This line

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<sup>18</sup> Clausewitz, p. 584.

<sup>19</sup> Major Richard J. Quirk, III, The Artist's Approach to Military Decision-Making at the Operational Level, U.S. Army Command and General Staff College, Fort Leavenworth, Kansas, 1986: p. 10.

of reasoning wrongly reinforces the widely held belief that faulty intelligence estimates, not the faulty use of intelligence estimates, are the cause of bad decision making.

In fact, commanders are rarely in control over events on the battlefield. War is permeated by uncertainty, friction and chance; it involves constant change on the part of the adversaries, who act and react independently, without ever having complete knowledge about one another. Since war involves an endless amount of variables whose relationship is unclear and continuously shifting, its sheer complexity makes any purely rationale calculation or planning impossible by definition<sup>20</sup>.

Applying the practical essence of modern operational art through the use of the non-predictive model described in this paper acknowledges the uncertainty, chance, fog, and friction inherent in war. This emphasis on operational art and non-predictive analysis is important because, instead of relying on the current predictive form of planning and decision making that tends to deny that risks exist by assigning probabilities to them and therefore viewing many of them as unlikely, it highlights acceptance and management of risk as an essential responsibility of command <sup>21</sup>. The primary benefit of this approach is that it concentrates the efforts of the commander and his staff on reducing uncertainties about the present, therefore illuminating

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<sup>20</sup> Michael I. Handel, Masters of War: Sun Tzu, Clausewitz and Jomini, Frank Cass, London England, 1992. p. 120.

<sup>21</sup> Quirk, p. 30.

possibilities for the future. Prediction is not needed because decisions are made based on current risks, which can be largely ascertained by factual information<sup>22</sup>. These risks can then be reduced by the synergistic application of resources (capabilities) and time.

What are the potential results of the approach described above? First and foremost, it directly contributes to maneuver warfare by enhancing the relative speed, agility and ability of the commander to react to the unexpected. It allows him to use speed, maneuver, and the reinforcing effects of combat arms to reduce an enemy to impotence by concentrating on exploiting current enemy weaknesses, thereby creating future vulnerabilities, rather than expending time and effort predicting what they may be. Furthermore, by acknowledging that perfect predictions are not possible, it increases the likelihood that more good decisions will be made in a timely manner, vice great decisions made too late.

Whether termed revolutionary or evolutionary, the methods of warfare are undoubtably changing. The nature of warfare is not. Technology is providing new capabilities and access to information with unprecedented levels of quantity, quality, and speed. The challenge for commanders, present and future, is to critically analyze the ramifications of these changes, and adjust as required to take advantage of them rather than waiting for, or assuming that, a predicative analysis will insure victory.

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<sup>22</sup> Quirk., p. 34.

THE ESSENCE OF OPERATIONAL ART AND  
THE NON-PREDICATIVE DECISION-MAKING PROCESS

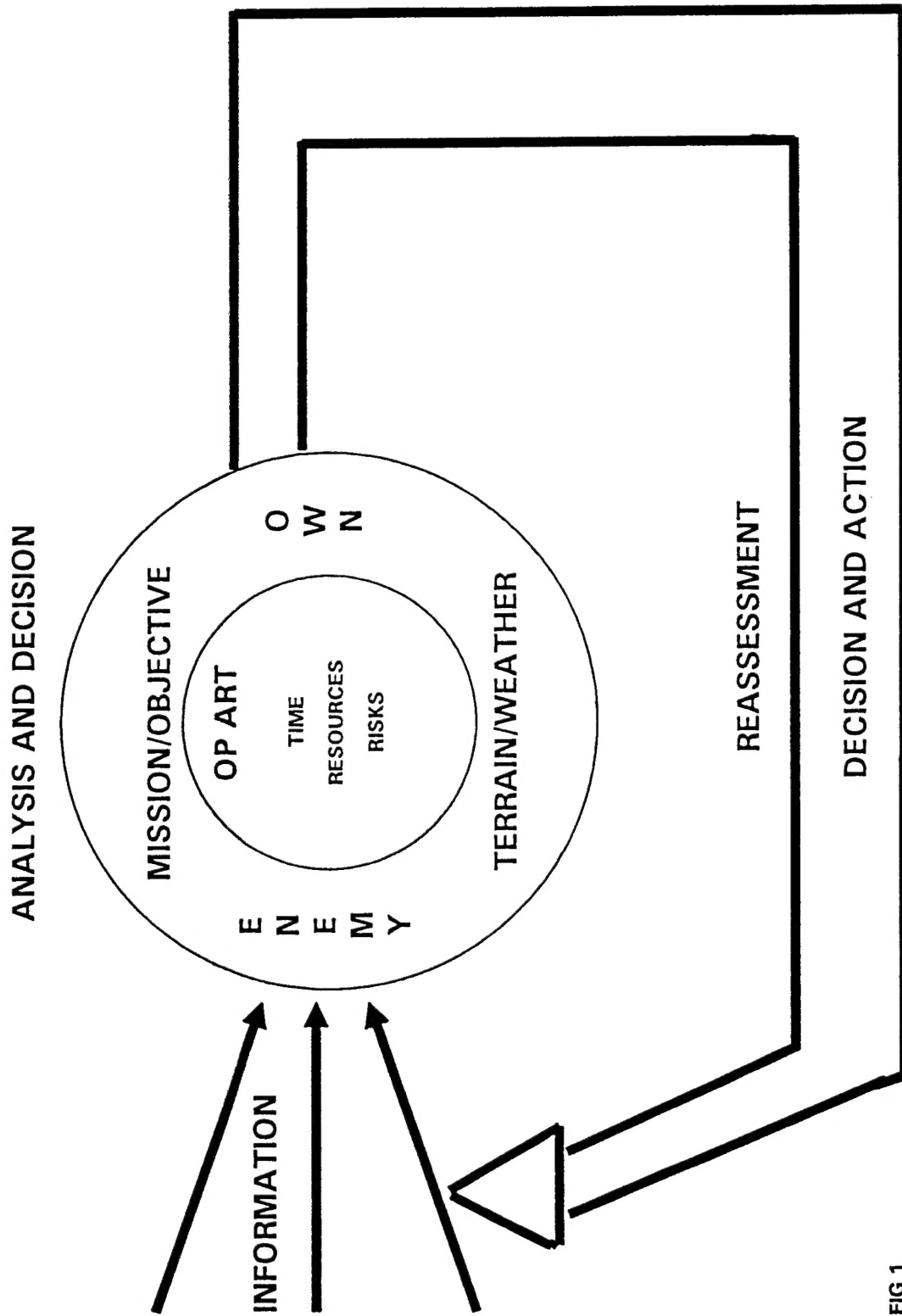


FIG 1

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